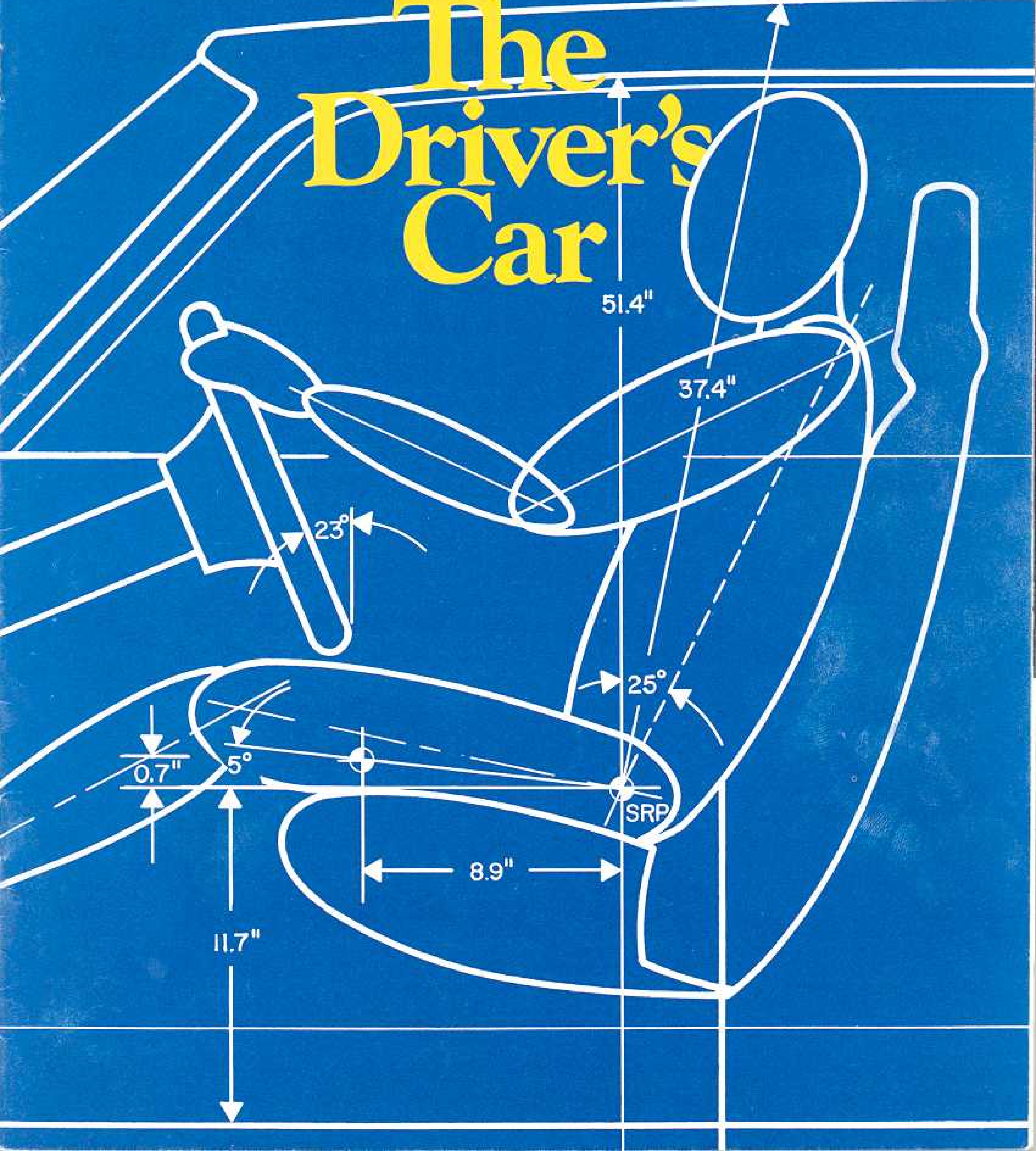
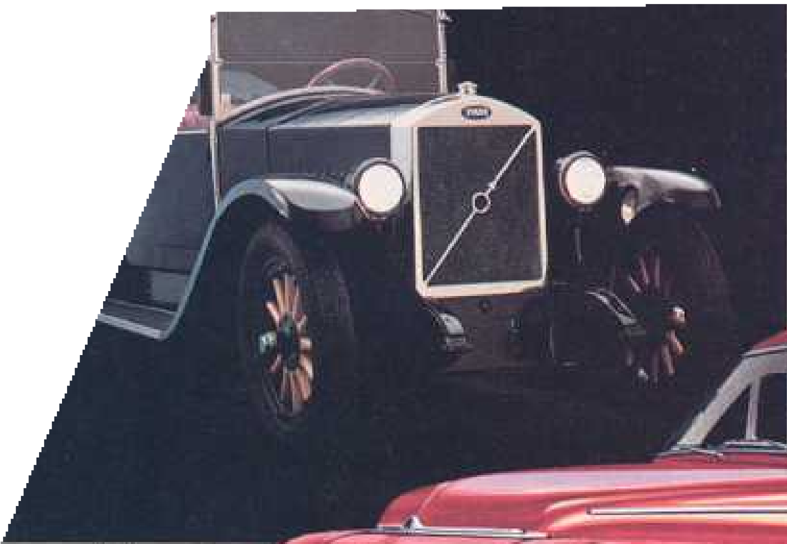
VOLVO

The Driver's Car





(a)



(b)



(c)

In the excitement and commotion surrounding production of the very first Volvo, nicknamed Jakob, the crown wheel was mistakenly mounted on the wrong side of the pinion. When the driver put the car into first gear to drive out of the plant, Jakob promptly ran backwards! The red-faced engineers quickly put the fault right, and in the early morning hours of April 14, 1927, Jakob left the plant headed in the right direction. Volvos have been going in the right direction ever since.

The reason for Volvo's success — in an industry known for its trends, fads, and failures — is the constancy of the Volvo concept.

From the beginning, the concept

The Car everyone is still trying to build.

has been to design and build cars that are totally dependable in every respect. Durable cars with efficient, reliable engines. Cars that have predictable handling characteristics. Cars that are safe, and justify their price.

Volvos have changed over the years because the concept has not. Evolved and improved throughout half a century, the 1981 Volvos are better cars than any of their predecessors — each of which was outstanding in its own time.

"It does feel like it's built out of old (bank vault) doors, but it can be thrown around like a sports car when you're in a hurry."

T.Q. Jones, Automotive Consultant for the *Austin* (Texas) *Citizen*, couldn't have written this description about any other car but Volvo. (Specifically, the 1980 Volvo GL.) He goes on: "... the car does things the way cars are supposed to do things. It's a car built for some of the worst roads in the world ... turns into a handsome prince on anything better than a goat track." Because we strive for continuous improvements, we're confident T.Q. Jones could say exactly the same thing about the 1981 Volvos.

After reading this booklet, and test driving the car you'll have a better understanding of the Volvo vocabulary. After becoming a Volvo owner, you can't help but become an avid contributor.

The Volvo legend, continued:

The GLE Sedan and Wagon: "It's in a class by itself because it's both a practical, no-nonsense car and a luxury sedan at the same time."

"I know it's a wagon, but it's just like driving a car."

The Bertone Coupe: "Once I looked at other luxury cars, I knew Volvo offered more."

The GLT Sedan and Wagon: "They don't call it a sports car, but I wouldn't own any other kind."

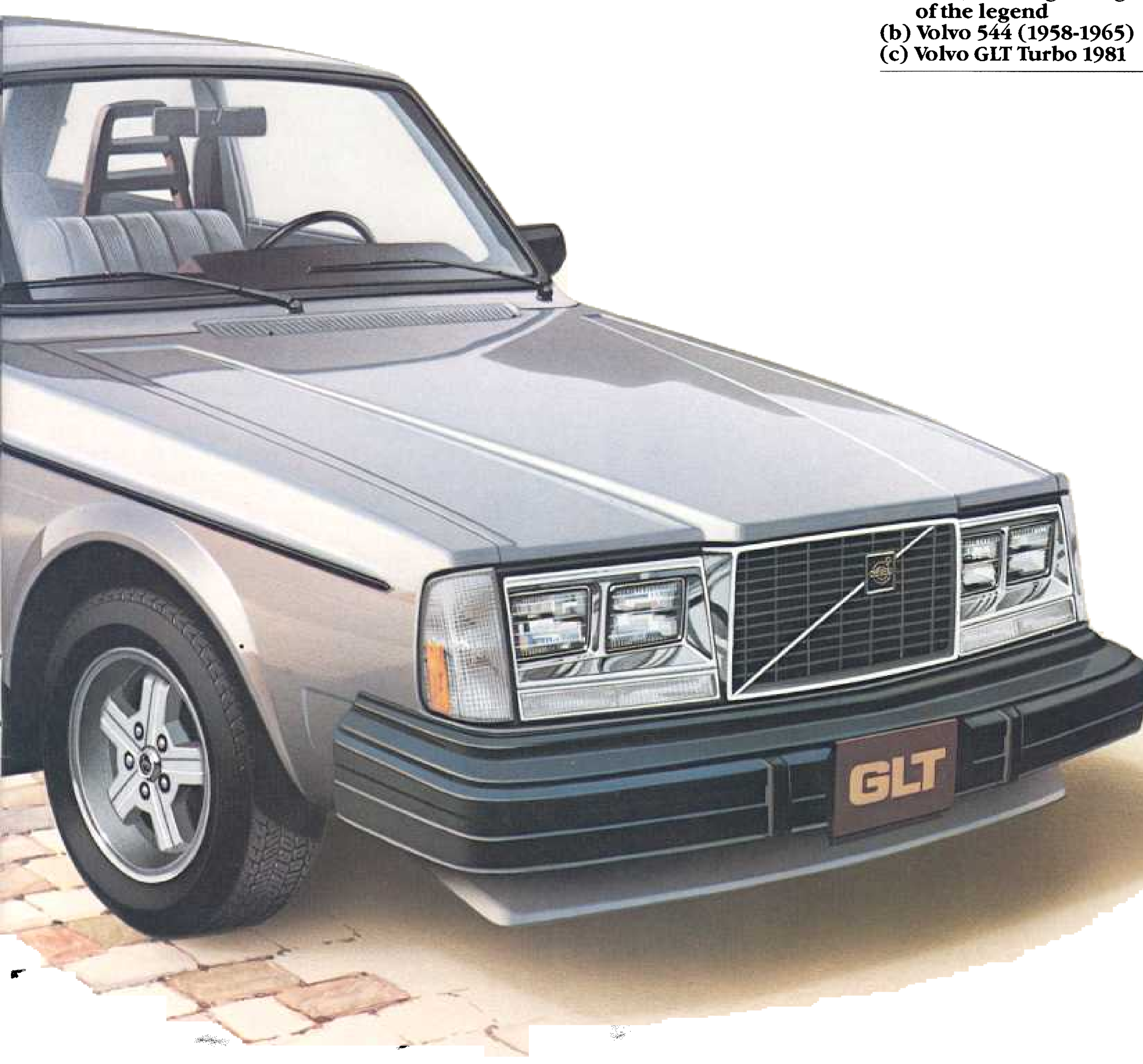
"It's the newest Volvo wagon, but I think it's a wolf in sheep's clothing."

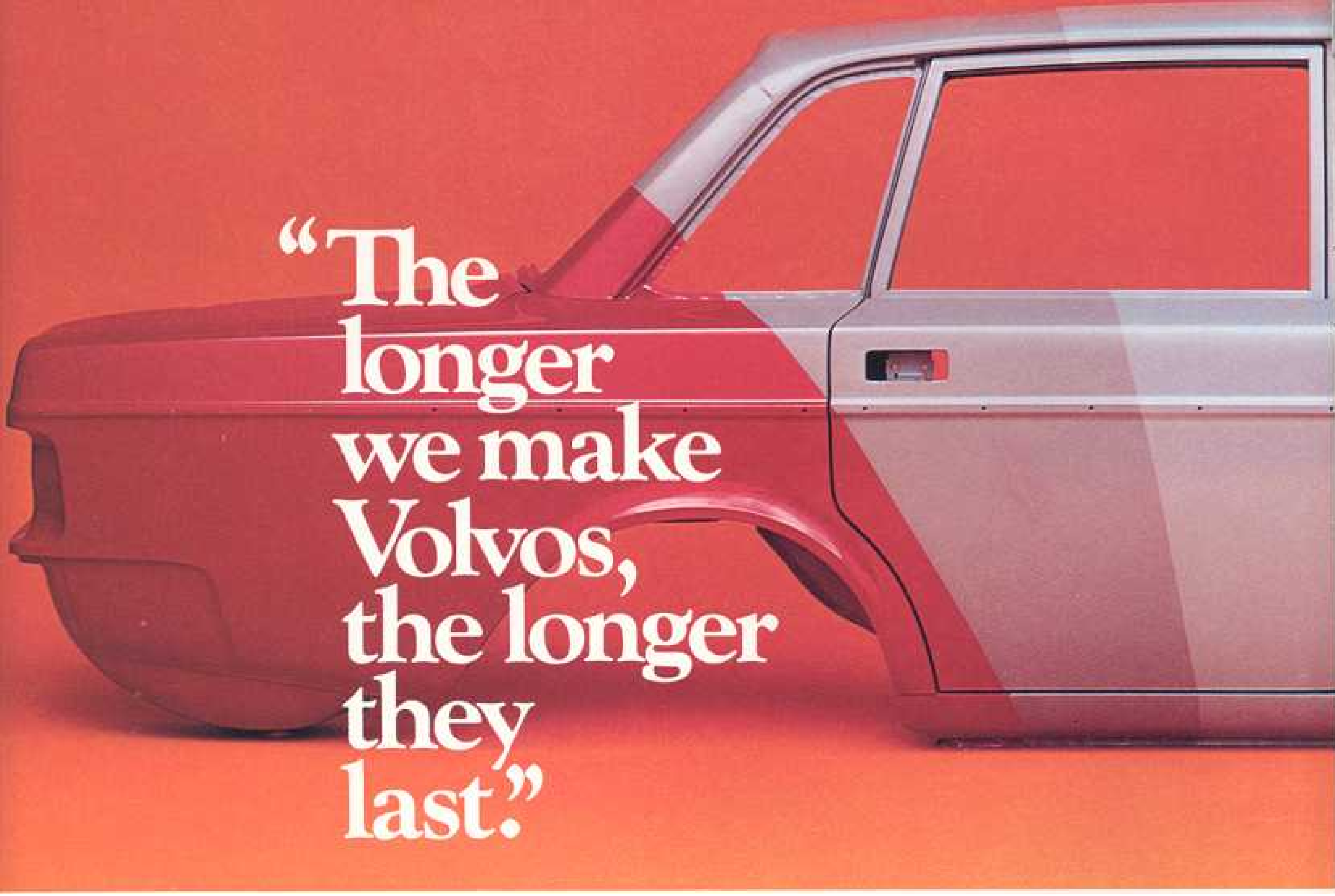
The GL Sedan: "If there's no such thing as a perfect luxury *and* economy car, then the GL is the most nearly perfect."

The DL Sedan and Wagon: "Comfortable? It's a pleasure to ride in ... long trips don't wear me out."

"Why spend $9,000 for a wagon that's going to last half the amount of time a Volvo wagon will?"

(a) Volvo "Jakob" (1927-1929) The beginning of the legend
(b) Volvo 544 (1958-1965)
(c) Volvo GLT Turbo 1981





Time, it would appear, is on Volvo's side. Gone are the days when Americans had to have a new car every three years, as a measure of their success. Never mind that many of those cars *needed* to be replaced anyway. New was best, and planned obsolescence had become a manufacturing standard. Whatever the causes — greater consumer awareness, dwindling resources, economic conditions — American priorities have changed. "I want value for my money," has re-emerged as an important factor in the buying decision, especially when it comes to buying a car. As more Americans are discovering, Volvo builds cars from the ground up, inside and out, in the old American — and Swedish — tradition of lasting quality.

An automobile's ability to resist rusting has a crucial bearing on its longevity.

Given the chance, corrosion will attack the internal structure of a car, making it unsafe to drive. Corrosion will also destroy the exterior, reducing the car's resale value.

Galvanized steel and Zincrometal® are used for key body parts and structural members vulnerable to rust.

Galvanizing adds a layer of zinc to Volvo's steel frame, which protects it against rust corrosion. 37.7 square feet of the sheet steel that go into each Volvo is submerged in a hot zinc bath. Both sides are evenly coated with a layer of zinc three times thicker than possible through the more popular, less expensive, and faster process in use today, called electro-galvanizing. The thicker layer takes full advantage of zinc's unique "self-healing" properties: when the surface of Volvo's galvanized steel is scratched, the zinc molecules migrate to the scratch and fill it in, thereby continuing to inhibit rust from forming.

Zincrometal is used to manufacture the front fender panels. It's a rust-resistent sheet steel coated with a special zinc-rich primer that's baked on at a high temperature. Plastic fender liners in the front wheel housing further protect the panels from dirt, gravel, and the road salts commonly encountered during winter driving. A plastic splash guard underneath the engine compartment protects it from dirt and salt spray, too.

*Zincrometal is a registered trademark of Diamond Shamrock Corporation.

Over 4,000 spot welds keep joints from rubbing against one another, and becoming targets for rust.

To minimize rust-prone joints, Volvos are assembled from the largest possible body panels. These panels are fused together with spot welds, each of which is strong enough to support the weight of the car's entire body. Special equipment checks the results of the panel assembly to insure that the body parts fit together perfectly.

Every inch of the Volvo is basted with protective, anti-corrosive coatings.

The floor is first coated with an abrasion-resistent polyester paint. Then, the floor and the front wheel housings are covered with a thick asphalt compound, which also serves as a sound deadener.

The surfaces that wear in the rear wheel housing are covered with an "armed" bitumen coating. Rust-proofing oil is sprayed on the engine's underside components, the axles and the suspension, and on everything else that's exposed to the elements. On the assembly line, Volvo sprays a thin, penetrating anti-corrosive gel into the closed body sections, the roof pillars, the doors, and rocker panels.

Volvo bodies receive a four-coat paint process above the beltline, and a



five-coat process below.

After assembly, the Volvo body is thoroughly cleansed to remove any loose, blemish-causing particles and then sprayed with a crystalline zinc-phosphate coating, which cleans and etches the metal for maximum paint adhesion.

Next, every surface and crevice of the entire body receives an electrostatic primer bath that assures a thick, uniformly bonded primer coating. Excess primer is washed off, and the body is oven-baked. Sanding and a meticulous inspection follow.

Because the paint below the beltline — the lower half of the doors, door sills, and rocker panels — is especially susceptible to chipping, the area is sprayed with wet-on-wet layers of polyester paint. The polyester layers remain resilient, and prevent the final coat of paint from chipping in 80 to 90 percent of the cases in which damage would otherwise occur. Door sills, rocker panels, and the underside of the floor are also sprayed with a polyester abrasion-resistent paint.

To even out any remaining roughness, a final primer-surfacer is sprayed on and baked in; the entire exterior is wet-sanded; and a sealer is applied to the exterior surfaces, including the doors and latch facings; and again baked in.

At last the exterior surface is ready for the thick wet-on-wet application of enamel or lacquer-sealed metallic finish. Beautiful skin, in either case.

Slipstream ventilation of the rocker panels is another unusual rust-preventive feature.

Used by Volvo for over a decade, this process is designed to prevent moisture from collecting in the air intake and inside the door sills, two areas likely to rust. When rain or wash water enters the air intake, it flows downward through the bulkhead and out through holes drilled in the bottom of each door sill. When air flows through the intake as the car is moving, it follows the same path, ensuring the evaporation of any residual moisture.

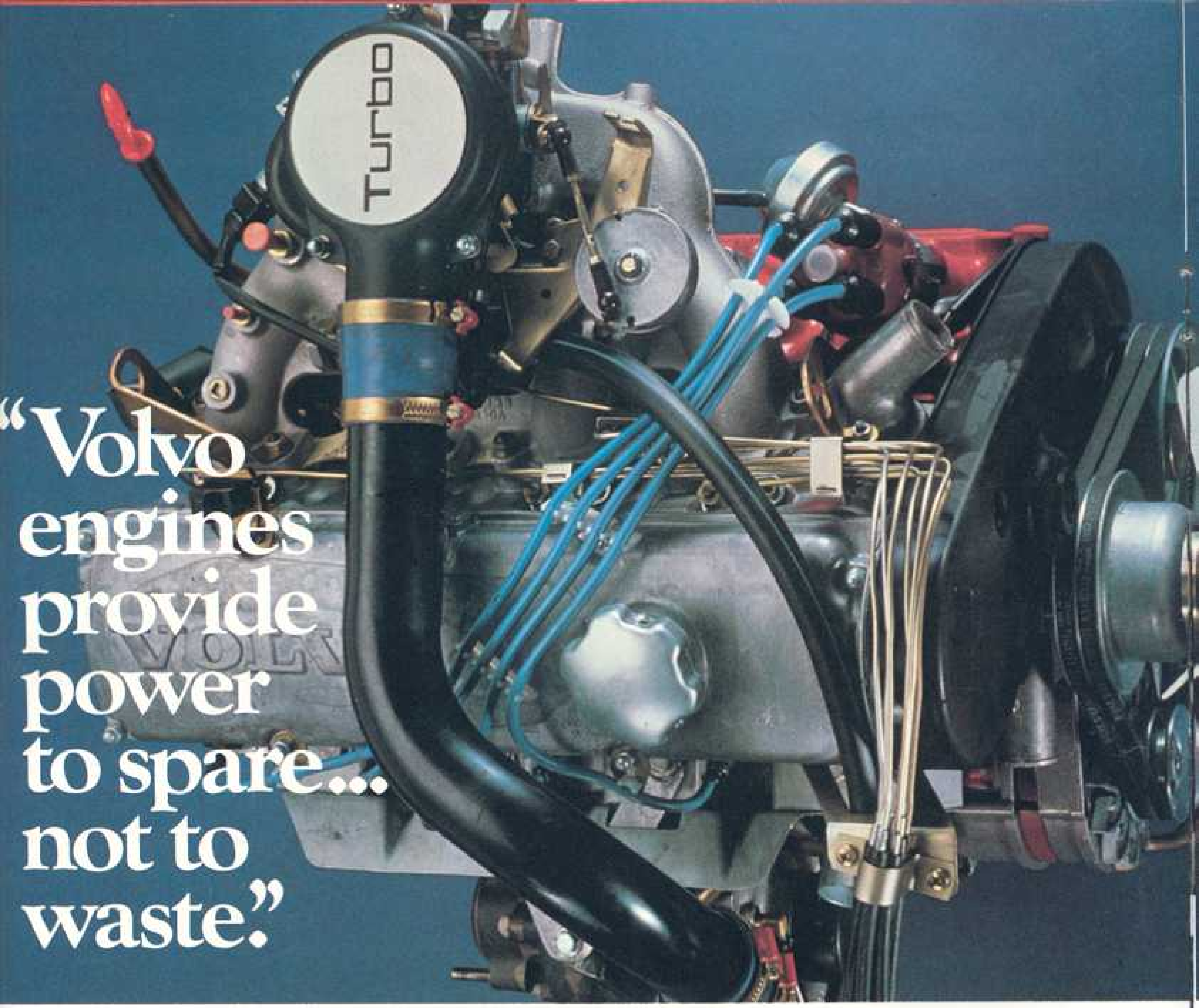


(d) High quality, durable protective finishes help Volvo's last and retain their value.
(e) Plastic fender liners are added to the front wheel housing for added protection against road salts and dirt.

When you know how Volvos are made, it won't surprise you that, according to the Swedish Motor Vehicle Inspection Bureau, Volvos have a *steadily increasing* and a longer life expectancy than any other car on the road in Sweden — an average of 17.9 years.

The Volvo body design eliminates all unnecessary enclosures and crevices where moisture and dirt collect. Door latches have built-in drains: water that runs in runs out. Expensive rust-proof stainless steel trim is used, mounted with plastic holders. The front grille is made from chip-resistent ABS plastic. The exhaust system is partially aluminized to resist rust. Special alloy brake lines are used, because the alloy is stronger than pure copper and more rust resistent than galvanized steel, which is the most common material used.

And the list goes on and on . . .



"Volvo engines provide power to spare... not to waste."

During the 1950's and 60's, the name of the game among most auto makers was horsepower, the more the better. Until recently, people used to wonder why Volvo didn't play the same game. Now those rival auto makers have begun echoing what Volvo has always said — horsepower alone doesn't equal performance, and it certainly doesn't equal economy.

Volvo engineers have refined Volvo's entire line of engines so that they deliver more torque over a wider range of speeds. This contributes to better performance and efficiency from initial acceleration, through high speed passing situations.

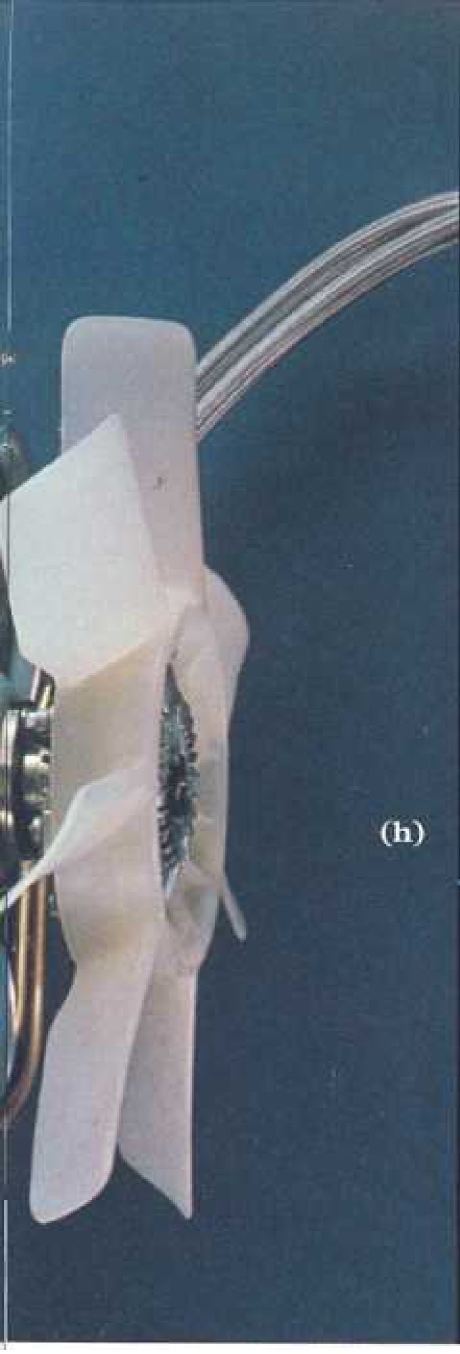
Right along, Volvo engineers continued with a performance equation that balanced ample engine power and economy; the car's handling, steering, and braking; its ride; its safety characteristics. And, because they didn't play the game, they spent their time steadily improving Volvo's performance over the years, rather than having to play catch-up in the 70's, or today.

Since so many technical variables are involved in the performance equation, Volvo engineers assume that responsibility for matching a particular engine with a particular model. Consequently, every Volvo delivers optimum performance.

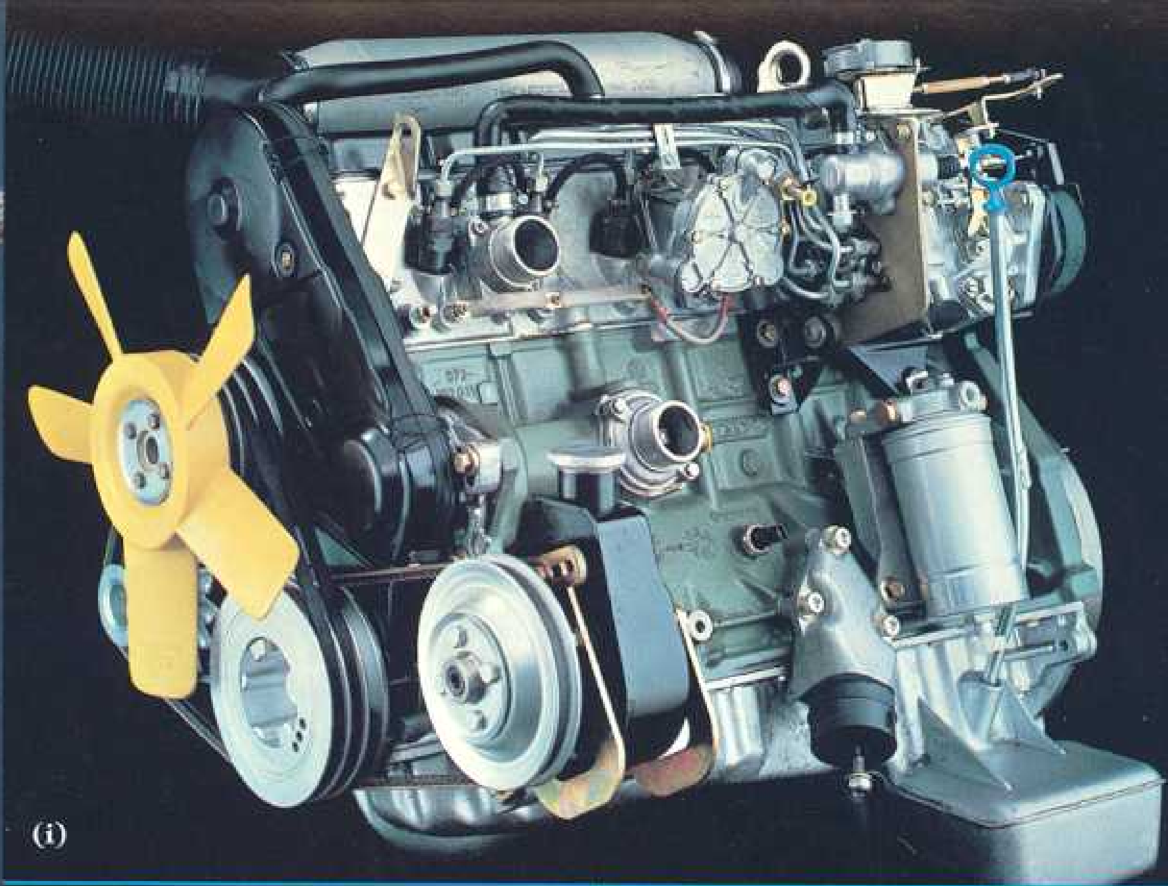
Perfect engines for the Volvos they serve.

(f) The B28F V-6. Volvo engineers have specified this engine for the GLE's and the Bertone Coupe. The compact V-6 configuration allows room for emission control and fuel-injection equipment — and for energy absorption, to help keep the engine away from the passenger compartment in case the car is in a collision. The engine block and cylinder heads are a light, cast-aluminum alloy. This saves weight, allows for an even front-to-back weight distribution (to improve traction) creates a high power-to-weight ratio and indirectly lessens fuel consumption. Also, aluminum dissipates heat faster than cast iron; more efficient cooling reduces engine wear. The overhead camshaft design has few components subject to fatigue, and few parts that require servicing. The cumulative result: an efficient, hard working, durable engine that offers reasonable V-6 fuel economy, and power to spare when you need it.

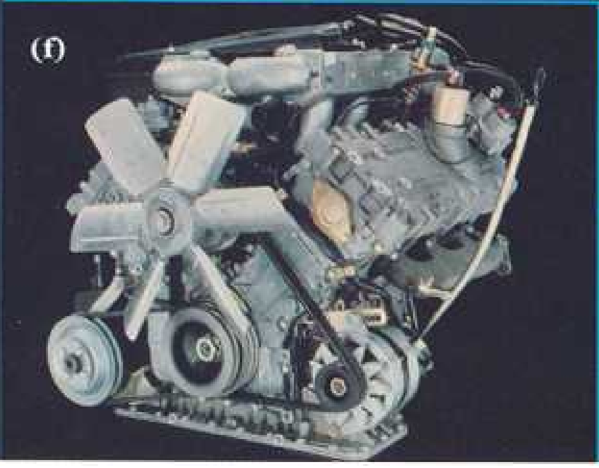
(g) The B21F. Volvo's basic four-cylinder engine is just right for the GLTs, GLs, and DLs that don't have the Turbo. It has a "cross-flow" cylinder head that gives the engine relatively hot and cold sides, promoting rapid cooling and longer life, and improves performance by providing a free flow of exhaust gases. The valves are in-line, actuated directly by the overhead camshaft. This particular overhead camshaft de-



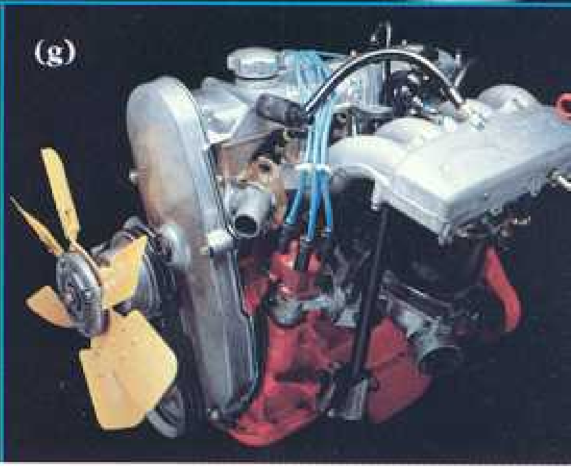
(h)



(i)



(f)



(g)

sign eliminates push rods and rocker arms, thereby reducing internal vibration and wear. Volvo owners find the B21F rugged, dependable, and capable of delivering plenty of power without squandering fuel.

The B21F-MPG. A new electronic ignition system, added to the basic B21F, increases fuel economy by 6 to 10 percent. Being new, the system is still in limited production, so for the moment the engine is only available in the two-door Volvo DL without a sunroof.

(h) The B21F-Turbo. A turbocharged B21F engine boosts the high performance of the GLT, without affecting its fuel economy. Volvo engineers are proud to introduce a 30- to 40-percent increase in torque over the unboosted engine, when running at the same rpm. The energy of the exhaust gas, instead of just passing through the tail-pipe, is used to drive a turbine mounted on the exhaust manifold. In turn, the turbine drives a compressor that pressurizes the intake air to the engine. In other words, the 2.13 liter B21F engine, modified with the turbocharging unit, performs like a 3-liter engine. The additional burst of power is reserved for mid-range speeds, to help you get into fast-moving highway traffic, and pass with impunity. To control the boost pressure accurately, and to avoid pre-ignition and severe engine damage, the system has an integrated "wastegate," which allows excess exhaust to by-pass the turbine. A gauge on the dash monitors pressure, too. Necessary engine modifications include a new piston design (which reduces the compression ratio to 7.5:1), a modified camshaft with very mild valve timing, sodium-cooled exhaust valves, a new intake manifold and exhaust system, a new air filter (to increase the flow of air), and a thermostatically controlled oil-cooler which keeps oil temperature within acceptable limits for peak engine efficiency. The result is impressive. And surprisingly quiet.

(i) The D24. The engine Volvo engineers have put in the Volvo diesel sedan and wagon would undoubtedly please Rudolf Diesel himself. It's the only six-cylinder diesel engine in a passenger car today. The additional cylinders successfully overcome the disappointments attendant upon standard four-cylinder and five-cylinder diesels: The D24 meets Volvo's power standards with life to spare. "Swirl chambers" designed into the cylinder heads reduce the familiar diesel engine noise, and the swirling air patterns they create ensure a quiet, rapid and thorough mixture of air and fuel. The in-line, six-cylinder configuration makes the D24 as well balanced as a V-8. For a diesel, that's incredible.



"Every Volvo delivers optimum performance."

Continuous Flow Fuel Injection and transistorized ignition are standard on all gasoline-powered Volvos.

A superior fuel distribution system, Continuous Flow Fuel Injection automatically regulates the flow of fuel and the air-to-fuel combustion mixture as changes occur in the volume, temperature, humidity and barometric pressure of incoming air. With a simpler, more reliable, *mechanical* air sensor and fuel distributor, the system is more sensitive to an engine's air and fuel requirements than *electronic* fuel injection. Because the fuel injection is so precise, Volvo engines offer better fuel economy, greater horsepower, faster warm-up (with no possibility of flooding), and cleaner exhaust than ever before. As you may have surmised by now, improving on improvements is part of the Volvo engineering tradition.

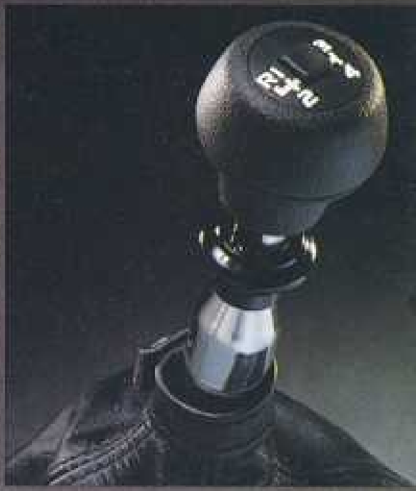
An effective ignition system has one main function: to send sufficient voltage to each spark plug at precisely the right time. Any breakdown lowers engine performance and fuel economy, and increases exhaust pollution. So Volvo engineers specified a solid-state, electronic control unit that does away with breaker points and condenser, the components subject to malfunction. Compared to conventional ignition systems, the Volvo transistorized ignition provides a consistent and controlled spark for precise combustion — increasing Volvo's engine performance and fuel economy, and reducing exhaust emissions.

The choice is yours: a four-speed manual transmission with overdrive, or a three-speed automatic.

Volvo's fully synchronized manual transmission has first and second gear ratios designed for powerful acceleration, hill-climbing (or trailer pulling), prolonged engine and clutch life, and a quiet transmission. Those who are wary of a manual transmission should be encouraged by Patrick Bedard, a writer for *Car and Driver*: "The takeup in a Volvo clutch is so silky and so gradual. And the effort drops off in such a marvelously linear fashion as you let out the pedal. If you ever have to teach your sister how to drive a stick shift, this is the car to do it in. She'll find it easier than tangoing on Arthur Murray's footprints . . . in the whole car kingdom, no other works half so well."

The overdrive that comes with the Volvo manual transmission also deserves mention, because it is easier to use than a true fifth gear. Having reached the proper highway speed, the driver flicks a switch on top of the gear shift lever and the overdrive *automat-*





(j)



(k)

(j) Overdrive, which improves fuel economy and lowers engine RPM's on the highway, is standard with the four speed manual transmission.

(k) Trademarks of the three-speed automatic transmission are its performance, its quietness, and its smoothness through the gears.

ically engages, lowering the engine PRM's by 20 percent; reducing noise, and increasing fuel economy. When it's necessary to drop back down into fourth, for power to pass or climb hills, the driver simply flicks the switch off. A down-shift below fourth gear *automatically disengages* the overdrive, so the driver doesn't have to remember it before shifting back up.

On the other hand, if you choose Volvo's automatic transmission, you'll be impressed with its performance, its quietness, and its smoothness through the gears. Acceleration through the lower gears is set for a wide range of speeds, eliminating the sluggishness often associated with automatics. And, when you need extra acceleration, additional pressure on the accelerator automatically shifts the transmission to the next lowest gear.

The Volvo Lamba Sond® emission control system was acclaimed as the "most significant break-through ever achieved in the fight to obtain clean cars."

Lamba Sond is standard equipment on all gasoline-powered Volvos. Its introduction earned Volvo the Award for Excellence in Air Pollution Control, for the National Environmental Industries Council.

The challenge was to find a way to control the three major air pollutants: carbon monoxide, hydrocarbon, and nitrogen oxide. Volvo engineers found that if they could monitor and control the ratio of oxygen present in the exhaust gases entering the converter, a three-way catalyst would solve the problem.

Using an unusual substance called zirconia, developed by the U.S. space program to detect the presence of oxygen, Volvo engineers produced a sensing device that could detect the oxygen in their engine's exhaust gases. It works like an on and off switch, telling the engine to run a leaner or a richer air-to-fuel ratio, thereby maintaining the proper degree of oxygen in the exhaust gases, so that the converter functions efficiently.

Another obvious advantage of the Lambda Sond system is that it eliminates the loss of power and of fuel economy associated with many other systems.

"Volvos are built to respond predictably."



"The Volvo is a genuinely amusing car to drive."

This assessment by David E. Davis in *Car and Driver* shocks those who think of Volvos *only* as safe and dependable. However true it is that they *are* safe and dependable cars to drive, the active safety features — the steering, braking, and suspension systems — combine to give Volvo its formidable style when you're out on the highway, going around curves, or braking hard for a quick stop.

You see, Volvos are built to respond predictably to your reactions in a crisis, just as they respond predictably to your actions under normal driving conditions. They're eminently controllable cars, enjoyable, interesting, *and* safe to drive — by design.

The best way to evaluate Volvo's handling characteristics is to take a test drive; still, there's much to be said about the systems involved that will enhance your judgment.

Rack and pinion steering is standard on all Volvos, because Volvo engineers believe it is the most responsive and reliable steering system that can be built into a car.

Rack and pinion steering has fewer moving parts and joints than other systems. Basically, this accounts for its reliability, and its responsiveness to your hands on the wheel.

With rack and pinion steering — at low speed, high speed, on a straightaway, through a turn, under normal driving conditions, in a maneuver to avoid an accident — your Volvo will remain predictable all the time.

It's a system designed to give you a consistent feel for the road, and the confidence that you're always in control of potentially uncontrollable situations.

Volvo engineers rejected full power steering in favor of power-assisted steering. While it makes turning your Volvo in its tight, 32-foot, 2-inch turning circle almost effortless, it doesn't diminish road feel through the steering wheel.

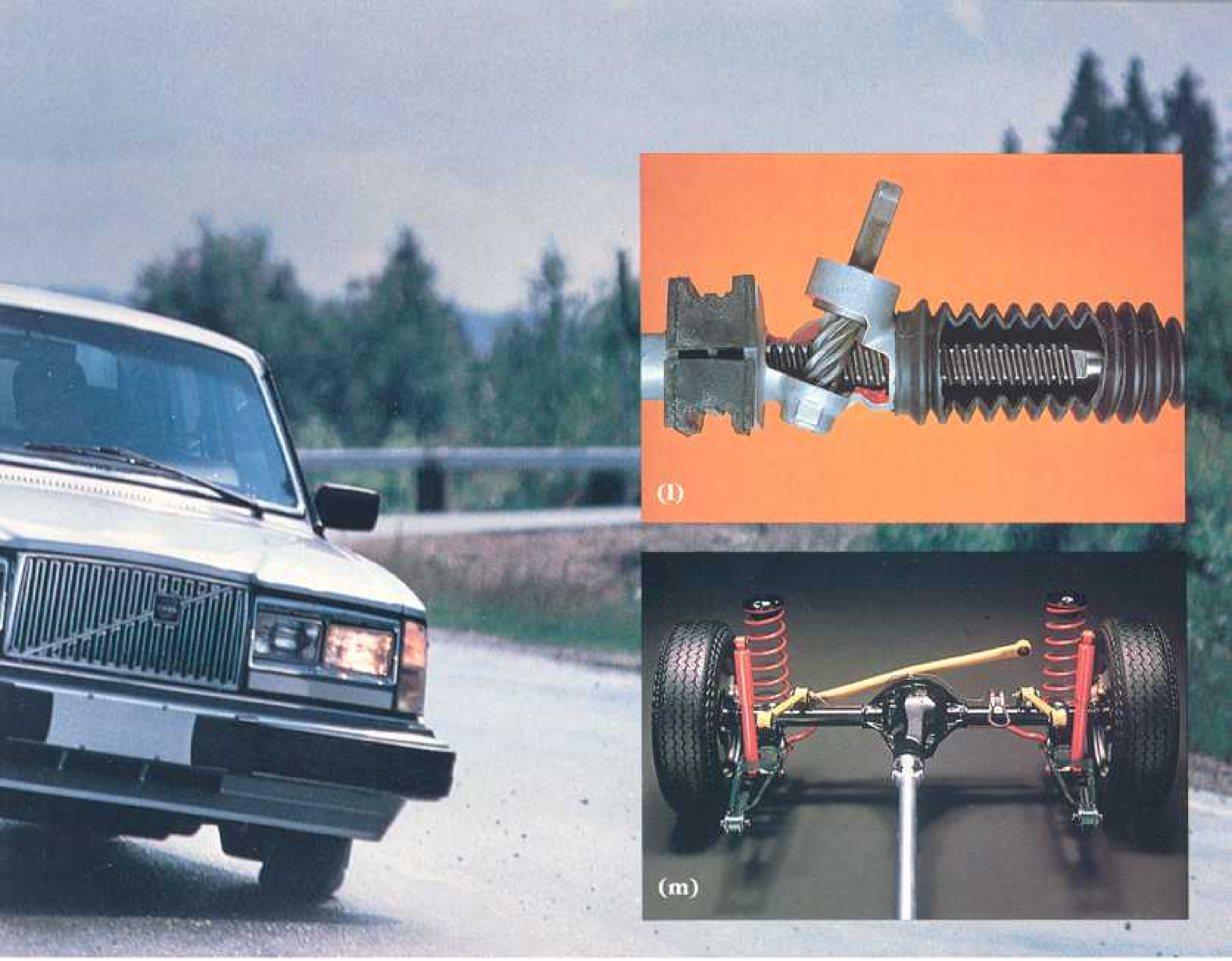
The Volvo is designed to understeer slightly when going around a curve. You have to follow your natural instincts and continually keep the car moving into the curve. A car that oversteers, on the other hand, tends to move the front end into a curve too quickly, a tendency the average driver can't always control, especially when the road is wet or icy.

All Volvos come as close as possible to a 50-50 front to rear weight distribution, so they're easier to control when cornering or braking.

A well-balanced car is one in which the weight is distributed as evenly as possible between the front and rear wheels.

Volvos have a weight distribution of approximately 51% front/49% rear, which changes to approximately 45% front/55% rear when fully loaded.

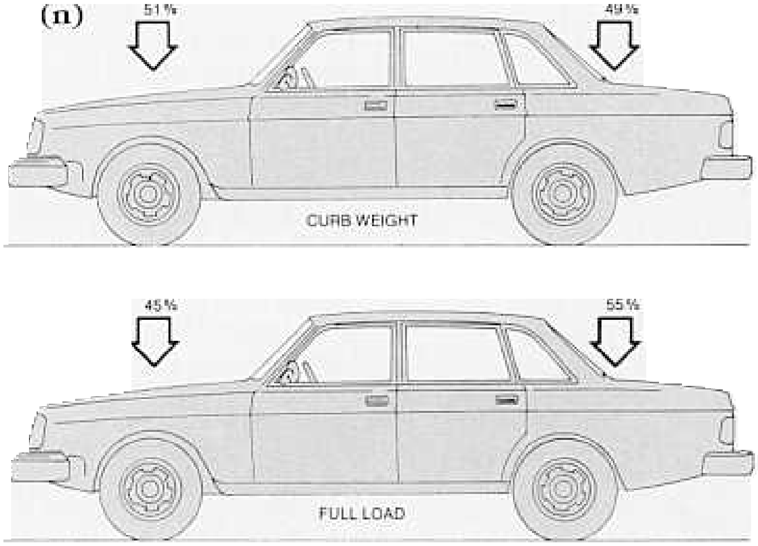
This distribution of weight makes the car easier to control when cornering. The fact that this weight distribution changes very moderately under increasing load, means that the car will retain it's good balance and predictability when you're carrying luggage or extra passengers.


(l)
(m)

All Volvos have a suspension that gives the driver precise steering control but doesn't sacrifice comfort.

(l) Rack and Pinion steering has fewer moving parts and greater accuracy and response than other steering systems.
(m) Volvo's "live" rear axle insures constant wheel to wheel track.
(n) Proper front-to-rear weight distribution contributes to the Volvo's handling characteristics.

(n)



All the suspension components are engineered to complement each other, and the steering and braking systems, weight distribution, and engine performance, as well. The Volvo ride is a delightful compromise between what people think of as typically European (stiff), and typically American (bouyant).

Each front wheel is independently suspended by McPherson strut, an ingenious device that incorporates a coil spring and a shock absorber into one unit. The spring controls the ride; the shock absorber dampens the movement of the body.

In back, Volvo engineers selected a "live" rear axle rather than an independent suspension, because it does the best job of keeping the rear wheels perpendicular to the road surface and maintaining a constant wheel to wheel track. Stabilizer bars counteract the tendency of the car to roll when cornering, but don't stiffen the Volvo ride on the straightaway. As a result, Volvo's road holding ability remains consistent in all driving situations, especially under slippery road conditions.

"All Volvos have power-assisted four wheel disc brakes."



For the safest, surest stopping all Volvos have power-assisted self-adjusting disc brakes on all four wheels.

Braking depends upon friction, and friction generates heat that in a panic stop can weaken, distort, or burn out conventional drum brakes. In addition, this heat can cause the brake fluid to boil. Disc brakes generate heat when hydraulic pressure presses the brake pad against the spinning disc, but the large discs used on Volvos have a greater capacity to absorb heat, and then cool off; therefore, the loss of braking affectiveness (brake fading) that can occur after repeated hard stops is reduced substantially.

To bring all Volvos to a stop with less effort, Volvo engineers have added power-assistance; you graduate the degree of pressure you put on the brake pedal, rather than having to control power brakes that can barely stand to be touched. In addition, there are special pressure limiting valves in the Volvo brake circuit that controls the hydraulic pressure on the rear brakes. This helps prevent premature rear-wheel lock-up, the principle cause of loss of control during a hard stop.

For extra safety, Volvo's disc brakes have a dual triangular split brake circuit system, and a stepped-bore master brake cylinder.

Typical brake circuit designs have a circuit for the front brakes, a separate circuit for the rear brakes or a diagonal circuit connecting one front wheel and one rear wheel. They're relatively simple and inexpensive. Unfortunately, if the front brake circuit fails, the braking effectiveness of the rear brake circuit can drop 70 percent, or more!

In the dual system Volvo has pioneered, each brake circuit simultaneously and independently serves both front wheels (the one that do most of the braking), and one rear wheel. Should one system fail, the other provides about 80 percent of the whole system's normal braking power, and equal control of the car.

Volvo's stepped-bore master brake cylinder contributes additional integrity to the dual brake circuit system. If one circuit fails and the brake fluid chamber drains, the master brake cylinder



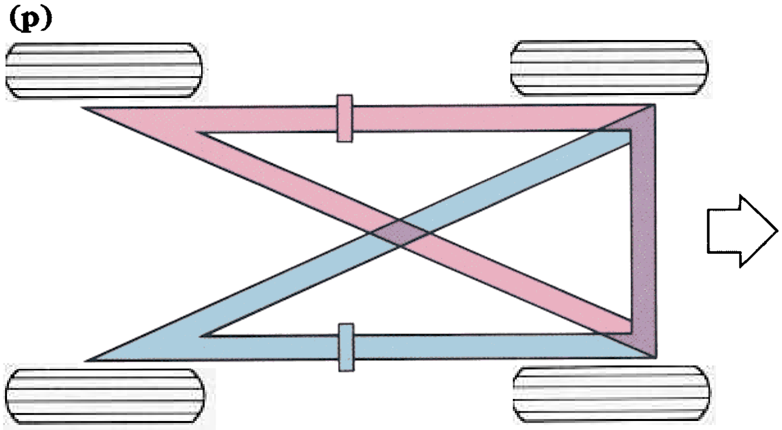
will maintain the pressure in the working brake circuit, enabling you to stop the car with a near normal amount of pressure on the brake pedal.

For better traction, all Volvos have steel-belted radial tires — mounted on wide-based rims, centered on lathe-turned hubs.

The use of wide-base rims makes it possible to select more efficient, better runing, wide-base radials. And, to make tire alignment less of a problem, Volvo rims are centered on lathe-turned hubs, for precise fit and true running. (The more common, and less precise method, uses tapered nuts or wheel bolts.)

Volvo engineers leave nothing to chance.





(o) Ventilated disc brakes have greater cooling capacity and are standard on all Volvos with front spoilers.
(p) Two front wheels and one rear wheel are controlled by two independent circuits.

"Every Volvo is a study in the science of making machinery more comfortable, more efficient, and safer for people."



Pity the car buyers who are blind to the folly of choosing trendy design over function — until they become unhappy drivers and passengers. In every Volvo form follows function; they're designed and built to fit *you*, rather than requiring you to fit into them. In fact, new owners keep discovering the fine points of ergonomic design even after they've driven their Volvos a while. To their everlasting delight . . .

All cars have doors. But Volvos have doors for adults — to open, to pass through, and to close.

Volvo doors are squarish, instead of being short and a mile long. (They don't weigh a ton either, though they have all the protective strength we can build into them.) And they open wide — to an angle of nearly 80 degrees. The height of the Volvo and the chair-height of its seats further complement the width of the door opening: you can get in and seat yourself without feeling like you're falling on the ground. What's more, the seat belt system is neat, simple, and out-of-the-way, so you won't strangle yourself climbing into the back of a two-door Volvo.

"The car's interior can comfortably accommodate five adults, and the trunk seems large enough to hold just about anything."

Anyone who spends a minute or two sitting inside *any* Volvo is impressed by how much room there is. Room for your head, shoulders, arms, legs — by design; room for long-distance comfort, whether you're driving or just along for the ride. Even in the back seat there's room for an adult to assume the normal sitting position: no knees tucked under chin.

When compared with other car trunks, the trunks of Volvo sedans *are* cavernous: 13.9 cubic feet of not just space, but *usable* space. Shaped like big deep boxes, they'll hold all your passengers' lugguage, and upright, the way properly designed car trunks should.

"Owners will talk you ear off about Volvo front seats."

"Front seats that all cars ought to have," is the way Rich Ceppos of *Car and Driver* describes them. The design reflects intense research into the forces that affect a seated person's back — forces that are greater on the spine when sitting than standing.

With the help of orthopedic surgeons, Volvo engineers built seats that adjust to accommodate almost every conceivable human shape and size (ninety percent of America's adult population) in a anatomically correct position. They are found to be incredibly comfortable, especially throughout a long trip.

The front seats slide back and forth to lock in any one of eighteen positions (one every half inch). Levers adjust the height and angle of the driver's seat nine different ways. The passenger's seat of the Bertone Coupe adjusts like the driver's seat. All other passengers' seats may be similarly adjusted by resetting a few bolts. The backrests can be adjusted to any angle between 90 and 170 degrees, to help you achieve the perfect driving position. (Somewhere between 110 and 130 degrees is considered to be the most relaxing.) When the seat is fully reclined, there's no ridge between the backrest and the seat cushion.



(q)



(r)

(q) The deep box-like trunk allows suitcases to be stored upright.
(r) The interior has exceptional front and rear leg and shoulder room.

"Front seats that all cars ought to have."



(s)


(t)

(s) The back rest of a Volvo seat is infinitely variable at any angle between 90° and 170°.

(t) Volvo's ergonomically designed instrumentation and information display provide the driver with easy to read dials and fingertip control.

Over sets of strong, flexible wires attached by helical springs to the steel frames, cold-formed polyurethane foam is used to build the seat cushions and backrests. The cushions provide proper thigh support without restricting your blood flow, the restriction that often causes one or both legs to "fall asleep." The backrests are dished to hold your upper body in place while the car goes around corners.

Unnatural pressure on the spine, the cause of back tension and driver fatigue, is virtually eliminated by the adjustable lumbar support built into each backrest — a component pioneered by Volvo.

The head restraints are permanently fixed into the seat frames at the proper height to reduce whiplash in a collision. They are "see-through" as well, so they don't create blind spots that could block your view.

What about the back seat? Unusually comfortable. The broad base is a thick cushion of cold-formed polyurethane foam; flexible but firm. A center armrest is standard equipment. The sides of the back are contoured, as the front backrests are dished, for support against the car's side-to-side movement.

Driving is hard enough without the car, or its instrumentation, getting in the driver's way.

Volvo engineers apply the laws of ergonomics to every part of every Volvo.

To reduce muscle tension and provide a more stable driving position, Volvos have a *left* foot rest, so both the driver's feet are on the same plane.

To improve defensive driving — looking out for the other guy — Volvo sedans and wagons have better than 90-percent *all-around* visibility from the driver's seat. The front door pillars, for instance, are no wider than the distance between your eyes, so you look around them, not through them. All glass is tinted, with a darker tint-band along the top of the windshield, to reduce glare. An anti-glare side mirror, and prismatic day/night rear view mirror are standard.

An instrument configuration and layout that gives the driver the most information and control, without drawing attention from the road, is important. In a Volvo, you can operate the turn indicator, headlight dimmer, and windshield wiper/washer without taking your hands off the steering wheel. For 1981, a redesigned dashboard includes a larger instrument cluster with a central speedometer and space for additional instrumentation. All dials, gauges, and switches are easy to read, day or night, and are easy to reach.

A twelve-outlet ventilation and heating system rapidly, evenly, and quietly distributes air. A continuous running fan, new for 1981, provides forced air ventilation even when the car is not in motion. This system effectively eliminates conditions that could make you or your passengers uncomfortable and your driving less safe. For defrosting, two outlets on top of the dashboard quickly de-mist the front windshield. Four adjustable outlets on the front of the dash enable you and your front-seat passenger to direct the flow of air — heated, air-conditioned, or fresh. Two outlets on each end of the dash direct air toward the side windows, to prevent fogging. Two outlets under the dash direct air to the floor; two rear floor outlets direct air to the back seat.

The grab handles over the doors, the door handles, the window winders (in Volvos without power windows), the lighted seat-belt console, the lighted glove-box (with a vanity mirror, and depressions on the inside of the door for beverages), the trunk light — these are among the myriad unobtrusive, instantly accessible, and just plain functional ergonomic details in every Volvo. More reasons why Volvos are cars people swear by — not at.



"In case you can't avoid an accident... Volvo's passive safety features are designed to help protect you and your passengers."

"They're safe cars," is an invariable response when people are asked what they know about Volvos. It's a justly earned reputation. When other auto makers were convinced that safety didn't sell, Volvo engineers were committed to researching, pioneering, and improving vehicular safety, long before it was required by law. By the time legislators and manufacturers woke up to the importance of auto safety, Volvo had become, as it continues to be, the model to emulate.

An all-steel, spot-welded unitized body provides the foundation for Volvo's passenger safety.

In Volvo's unitized body, the frame and the shell are spot-welded together to form a single, strong, lighter-weight unit.

The unitized body creates a "safety cage" that surrounds Volvo passengers on all sides.

The hollow steel profiles used in this area of Volvo body construction are designed to resist deformation, and effectively to maintain the integrity — the survival space — of the passenger compartment during a collision.

Tubular steel bars add extra protection where it's needed most — in all Volvo doors.

The doors are securely braced by a process Volvo patented. A wide beam welded to the floor, and a cross-panel behind the rear seat backrest, further increase resistance to impact from the side.

Front and rear "crumple zones" enable the Volvo to absorb impact.

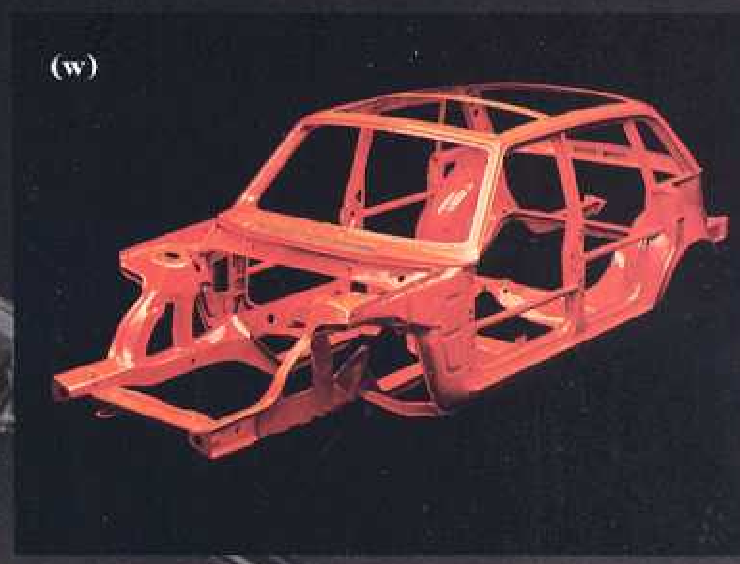
Special patterns are stamped into the sheet metal skin and structural framework of the Volvo to create areas designed to give themselves up in the event of a crash. As they give way, these front and rear "crumple zones" absorb the force of an impact rather than sending it into the passenger compartment. Part of the front crumple zone also forces the engine down under the floor.

The location of the fuel tank helps protect it against severe damage if the car is in a rear-end collision.

A typical sedan has its fuel tank positioned underneath the trunk, close to the rear; and has pipe situated by the license plate — a potentially dangerous position. The Volvo fuel tank is close to the rear axle; special impact members added to the body frame create a safety zone around it. In a severe rear-end collision, these members are designed to force the rear axle forward, to help prevent it from rupturing the fuel tank. Also, the tank is (completely) separate from the trunk floor and the passenger compartment. For additional safety, the fillerpipe is positioned near the rear wheel, and incorporates two bellow-type joints that provide a degree of give upon impact, reducing the risk of a fuel leak.

If you are thrown against the steering wheel, the steering column is







designed to collapse and cushion the impact.

The steering column offers the Volvo driver several stages of protection from injury, depending upon the severity of the impact.

In a "fender-bender," the large and heavily padded hub in the center of the steering wheel protects the driver. However, when the driver is thrown hard against the steering wheel, it is designed to align with the driver's body, and a crumple zone in the wheel anchorage reduces the risk of injury by spreading the force of impact over a wide area. If the impact is greater still, the upper section of the steering column will collapse away from the driver. A special slip-coupling that connects the upper part of the steering column to the body of the car then disengages, causing a plastic rivet to break, and allowing the column to permit a controlled collapse. In the most severe front-end collision, to prevent the steering gear and column from being forced upward toward the driver, the lower end of the column is designed to fold like a penknife, pulling the upper part of the column and the wheel forward and down, away from the driver.

Volvo was the first auto maker to introduce three-point seat belts as standard equipment — in 1959.

Three-point seat belts are an integral part of the safety engineering built into every Volvo. Even though the energy-absorbing front end may slow the car down

(u) Collapsible steering column:
(1) Retractable, telescoping steering shaft
(2) Split-joint mounting
(3) Crumple zone
(4) Impact-absorbing steering wheel
(5) Angled joint that folds under pressure

(v) Volvo is committed to researching and improving vehicular safety.

(w) A built-in "safety-cage" surrounds the passenger compartment.

during a collision, it does not slow down your body momentum. Without a seat belt on, there is nothing to prevent you from flying forward and being seriously hurt, even in an accident that results in little damage to your car. Volvo's three-point seat belts, with pattented slip-joint anchors, spread the momentum force (or load) evenly across your body and pelvic bone. The polyester fiber belts are tested to withstand a load up of to 7,900 pounds. Fitted with inertia reels, they are retractable and self-adjusting — easy to put on and easy to wear.

Volvo also includes three-point seat belts for the two outside *rear* passengers as standard quipment, though these are still not required by law. (A lap belt is included to protect the middle rear-seat passenger.)

When all is said and done, the most important things that go into Volvos are people.

THE 1981 VOLVOS AT A GLANCE.

DIMENSIONS AND WEIGHTS

Wheelbase	With Power Steering	104.3 in.
Overall Length		192.5 in.
Overall Height, Sedans		56.2 in.
	Wagons	57.5 in.
	Coupe	53.9 in.
Legroom, Front, All		39.8 in.
	Coupe	40.2 in.
Legroom, Rear, Sedans		36.6 in.
	Wagons	36.4 in.
	Coupe	33.5 in
Trunk Capacity, Sedans		13.9 cu ft.
	Coupe	13.7 cu ft.
Cargo Capacity, Wagons		41.1 cu ft.
Rear Seat Down		76.0 cu ft.

Approx. Curb Weights

DL, GLT & GL Sedans	2891-3065 lbs.
GLE & Diesel Sedans	3120-3149 lbs.
Coupe	3111-3123 lbs.
DL & GLT Wagons	3129-3262 lbs.
GLE & Diesel Wagons	3230-3263 lbs.

BODY

Unitized. Central passenger safety cage with energy absorbing front and rear ends. Rustproofing includes use of galvanized steel in susceptible areas; anticorrosive coating inside doors, rocker panels, etc; extensive undercoating and special stone chip resistant paint. Aluminum tailpipe and muffler.

B21F ENGINE: DL, GLT, GL MODELS

Fuel injected in-line four, cast iron block with light alloy "cross-flow" cylinder head. Overhead camshaft. Lambda Sond® emission control.
Displacement: 130 cu. in.
Compression ratio: 9.3:1
Horsepower: 107 @ 5250 (S.A.E.)
Torque: 114 @ 2500 (S.A.E.)
Sealed Cooling System: 9.9 qts.
Fuel tank: 15.8 gallons, unleaded 91RON

B21F MPG ENGINE is available on 2 door DL models.

This version of the B21F is equipped with a breakerless electronic ignition system with computer controlled spark advance — which in combination with a low rear axle ratio helps provide improved mpg.
Horsepower: 98 @ 5000 (S.A.E.)
Torque: 112 @ 3000 (S.A.E.)

B21F T: GLT TURBO MODEL

Fuel injected, in-line four, cast iron block with light-alloy "cross-flow" cylinder head. Overhead camshaft. Lambda Sond® emission control. Exhaust-driven turbo-compressor.
Displacement: 130 cu. in.
Compression ratio: 7.5:1
Horsepower: 127 @ 5400 (S.A.E.)
Torque: 150 @ 3750 (S.A.E.)
Sealed Cooling System: 9.9 qts.
Fuel Tank: 15.8 gallons, unleaded 91RON

B28F ENGINE: COUPE, GLE MODELS

Fuel injected V-6 with light-alloy cylinder heads and block; wet steel cylinder liners. Overhead camshafts. Lambda Sond® emission control.
Displacement: 163 cu. in.
Compression ratio: 8.8:1
Horsepower: 130 @ 5500 (S.A.E.)
Torque: 153 @ 2750
Sealed Cooling System: 11.5 qts.
Fuel Tank: 15.8 gallons, unleaded 91RON

D24 ENGINE: DIESEL MODELS*

In-line, overhead cam, six-cylinder diesel with indirect fuel injection into swirl chambers.
Displacement: 145 cu. in.
Compression ratio: 23.0:1
Horsepower: 76 @ 4800 (S.A.E.)
Torque: 98 @ 2800 (S.A.E.)
Sealed Cooling System: 11.5 qts.
Fuel Tank: 15.8 gallons

ELECTRICAL SYSTEM

12 V, solid state ignition. 55 amp alternator (70 amp alternator on GLE and Coupe models). 70 amp hour battery on six-cylinders; 60 amp on four-cylinders and 90 amp on diesels.

DRIVETRAIN

Manual: Four-speed fully synchronized transmission. Electrically operated overdrive which automatically releases when you shift from 4th to 3rd gear. Gear ratios: 1st 4.03:1 (GLE & Coupe 3.71:1), 2nd 2.16:1, 3rd 1.37:1, 4th 1.00:1, Overdrive 0.80:1. Final drive ratio: B21F, B21FT and B28F 3.73:1, D24 and B21F MPG 3.54:1, B21F (GLT) 3.91:1.

Automatic: Three-speed with a floor-mounted shift lever, with an illuminated PRND21 pattern. Final drive ratio: B21F 3.73:1, B21F MPG and B28F 3.54:1; D24 3.31:1.

STEERING SYSTEM

Rack-and-pinion gear. Servo-assist is standard on all models except DL sedans with overdrive and without a sunroof. Turning circle 32′2″. Turns lock to lock: 3.5 (4.3 without power-assist).

SUSPENSION SYSTEM

Front: McPherson struts incorporating coil springs and telescopic shock absorbers. Stabilizer bar. GLT's have larger diameter stabilizers and gas-filled shocks.

Rear: Rigid "live" axle located by longitudinal control arms and torque rods. Lateral location by track rod. Coil springs and telescopic shock absorbers. Stabilizer bar. The GLT sedan has a larger diameter stabilizer and gas-filled shocks. The GLE wagon has an automatic rear load leveler; no stabilizer bar.

Tires: Steel-belted radials. Size: DL sedans 175SR14; GL, GLE sedan, Coupe and Diesel sedan 185/70SR14; DL, GLE and Diesel wagons 185SR14; GLT sedan 195/60HR15; GLT wagon 185/65-TR15.

BRAKE SYSTEM

Self-adjusting disc brakes on all four wheels. Tandem type power-assist. Ventilated front discs are standard on the GLT, GLE, Coupe and Diesel models. Each circuit of the dual triangular-split hydraulic brake system connects both front wheels and one rear wheel. Stepped-bore master cylinder maintains near-normal pedal effort should one circuit fail. Handbrake operates mechanically on separate rear wheel drums.

VOLVO

The factory reserves the right to make changes at any time, without notice, to prices, colors, materials, standard equipment, specifications and models and also to discontinue models. Roof racks are optional equipment.

VOLVO

 Printed in U.S.A. ASP 02-1080-250 USA

*Volvo Diesel Sedans and Wagons are not available in California.